

IN THE SPECIFICATION:

Paragraph beginning at line 14 of page 4 has been amended as follows:

In case a of manufacturing a micro-mirror by the anisotropic wet etching, it results in problems such as that etching time is long and that a mask pattern ~~is complicated~~ for obtaining a desired mirror shape is complicated.

Paragraph beginning at line 17 of page 5 has been amended as follows:

In view of the above, the present invention has been accomplished in order to solve the foregoing problems and ~~manufacture~~ by manufacturing a micro-mirror having a verticality and small surface roughness, and the invention intends to provide a method of manufacturing a micro-mirror ~~by using~~ utilizing an anisotropic dry etching technique and anisotropic wet etching ~~technology, and~~ technology in combination with utilizing the crystal face of ~~silicon, and combining them~~ silicon.

Paragraph beginning at line 1 of page 6 has been amended as follows:

The present invention provides a method of manufacturing a mirror having a reflection surface vertical to the surface of a silicon substrate ~~comprising~~ comprising:

Paragraph beginning at line 22 of page 8 has been amended as follows:

In a further preferred embodiment, ~~including the method~~ includes a step of coating a thin film on the reflection surface.

Paragraph beginning at line 17 of page 9 has been amended as follows:

The present invention also provides a mirror device formed on a ~~substrate, having~~ substrate having at least two reflection surfaces each comprising a surface vertical to the surface of the substrate, in which the angle formed by the at least two reflection surfaces is 90° , and which is manufactured by the mirror manufacturing method described above.

Paragraph beginning at line 15 of page 14 has been amended as follows:

Fig. 1 is a cross sectional view for explaining a method of manufacturing a micro-mirror according to Embodiment 1 of the invention in which Fig. 1A shows a state of forming a mask material 4 on [s] a silicon substrate 3, Fig. 1B shows a state of conducting deep grooving etching of silicon by using DRIE and Fig. 1C shows a state of conducting anisotropic wet etching using an alkali solution.

Paragraph beginning at line 17 of page 15 has been amended as follows:

Then, as shown in Fig. 1B, a portion other than the mask material 4 is etched by anisotropic dry etching to form a micro-mirror precursor 11 having reflection surfaces 22 and 23. The depth for etching by using DRIE is made identical with or larger than the diameter of a beam irradiated to the reflection surfaces 22 and 23. Further, since the deep grooving etching comprises repetition of an etching step and a polymerization step, unevenness referred to as "scallop" is present on the surface of the reflection surfaces 22 and 23 in a micro point of view. Stated otherwise, the unevenness on the surfaces 22 and 23 are concavely-formed indented ("scalloped") portions formed during the anisotropic dry etching step.

Paragraph beginning at line 15 of page 16 has been amended as follows:

By the polymerization step of the deep grooving etching, a polymerization film comprising fluorides is deposited on the surface of the reflection surfaces 22 and 23. Since the polymerization film may possibly ~~formed a~~ form protection films or micromasks upon anisotropic wet etching of silicon to be described later, it is preferable to remove them. In the cleaning step for removing the polymerization film, ashing by oxygen plasma or argon plasma or acid cleaning with sulfuric acid and hydrogen peroxide or hot sulfuric acid is used. Since the polymerization film is removed chemically by irradiating the oxygen plasma to the silicon substrate 3, increase of the surface roughness caused by the micromasks formed of the polymerization film can be prevented. Further, when the argon plasma is irradiated instead of the oxygen plasma, since the ionic mass of argon is larger compared with that of oxygen, the sputtering effect is enhanced. This can physically remove the impurities including the polymerization film deposited on the side wall. Further, in a case of using a metal such as Al for the mask, cleaning for the side wall and the removal of the mask can be conducted simultaneously by dipping the silicon substrate 3 in a hot sulfuric acid or a liquid mixture of sulfuric acid and an aqueous hydrogen peroxide.